Waves

8-6 The student will demonstrate an understanding of the properties and behaviors of waves. (Physical Science)

8-6.1 Recall that waves transmit energy but not matter.
Taxonomy level: 1.2-B Remember Conceptual Knowledge

Previous/Future knowledge: Students have been introduced to the concept of energy in 1st grade related to plants (1-2.1), related to animals in 2nd grade (2-2.1), to light and electricity as forms of energy in 4th grade (4-5.2); and to forms and transformations of energy in 6th grade (6-5.2). Students have not been introduced to the concept of energy being transmitted in waves in previous grades. Students will further develop the quantitative concepts energy transmission in waves in high school Physical Science (PS-7.3 and PS-7.4).

It is essential for students to know that *wave* is a repeating disturbance or vibration that transfers or moves energy from place to place.

- Waves are created when a source of energy (force) causes a vibration.
- A *vibration* is a repeated back-and-forth or up-and-down motion.
- Waves carry energy through empty space or through a *medium* without transporting matter.
- While all waves can transmit energy through a medium, certain waves can also transmit energy through empty space.
- A *medium* is a material through which waves can travel. It can be a solid, liquid, or gas.
- When waves travel through a medium, the particles of the medium are not carried along with the wave.
- When there is no medium, certain waves (electromagnetic) can travel through empty space.

It is not essential for students to know the mechanisms (the oscillations of the fields) by which energy is transferred through empty space.

Assessment Guidelines:
The objective of this indicator is to *recall* that waves transmit energy but not matter; therefore, the primary focus of assessment should be to remember that waves as disturbances or vibrations that transfer energy. However, appropriate assessments should also require students to *recall* the definition of a wave and a medium; *recognize* types of media; recall the ways that waves travel; or *recall* what causes waves.